II. CLAIM AMENDMENTS

1. (currently amended) Method for encoding an input pattern of each of a succession of input signals using a normalizer and a classifier during a learning phase, said input pattern being characterized by an essential feature or shape and at least one main parameter, wherein said main parameter is an element susceptible of modifying the input pattern but not the shape, comprising the steps of:

establishing a reference value for the main parameter;

applying said input pattern for each of said succession of input signals to a normalizer that computes a main factor which measures an offset difference between the main parameter value of said input pattern and said reference value, and that sets the input pattern at said reference value as a normalized pattern using said main factor;

applying said normalized pattern for each of said succession of input signals and the category associated thereto by the user to a classifier; and,

storing the normalized pattern of a first input signal of said succession of input signals in the classifier as a prototype;

wherein said normalized pattern, said category and said main factor represent the encoded pattern; and

classifying individual ones of said input signals following said first input signal by use of the stored prototype of said first input signal, wherein, in said classifying, an input signal pattern is compared with the stored prototype.

2. (Previously presented) The method of claim 1 wherein said at least one main parameter is a mean value, and said main factor consists of an offset used to shift the input pattern to said reference value.

3. (Previously presented) The method of claim 1 wherein said at least one main parameter is the orientation of the input pattern, and said main factor consists of an angle value used to rotate the input pattern to said reference value.

4. (Previously presented) The method of claim 1 wherein said at least one main parameter is the amplitude of the input pattern, and said main factor consists of a gain used to modify the input pattern to said reference value.

5. (original) The method of claim 1 wherein said classifier is an input space mapping algorithm based artificial neural network (ANN).

6. (original) The method of claim 5 wherein said ANN comprises at least one ZISC neuron.

7. (currently amended) Method for encoding a new unknown input pattern of each of a succession of input signals using a normalizer and a classifier during a classification phase, said new input pattern being characterized by an essential feature or shape and at least one main parameter, wherein said main parameter is an element susceptible of modifying the new input pattern but not the shape, comprising the steps of:

establishing a reference value for the main parameter;

applying said new input pattern for each of said succession of input signals to a normalizer that computes a main factor which measures an offset difference between the main parameter value of said new input pattern and said reference value, and that sets the input pattern at said reference value as a normalized pattern using said main factor; and,

applying said normalized pattern for each of said succession of input signals to a classifier having normalized patterns stored therein as prototypes to generate the category by comparing an input signal pattern with a stored prototype, wherein the normalized patterns stored in the classifier are obtained from normalized patterns of previous input signals in said succession of input signals.

8. (original) The method of claim 7 wherein said at least one main parameter is of a mean value and said main factor consists of an offset used to shift the input pattern to said reference value.

9. (Previously presented) The method of claim 7 wherein said at least one main parameter is the orientation of the input pattern and said main factor consists of an angle value used to rotate the input pattern to said reference value.

10. (Previously presented) The method of claim 7 wherein said at least one main parameter is the amplitude of the input pattern,

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and said main factor consists of a gain used to modify the input pattern to said reference value.

11. (original) The method of claim 7 wherein said classifier is an input space mapping algorithm based artificial neural network (ANN).

12. (original) The method of claim 11 wherein said ANN comprises at least one ZISC neuron.

13. (currently amended) A method for decoding a new unknown input pattern of each of a succession of input signals during a classification phase, said new input pattern being characterized by an essential feature or shape and at least one main parameter, wherein said main parameter is an element susceptible of modifying the new input pattern but not the shape, comprising the steps of:

establishing a reference value for the main parameter;

applying said new input pattern to a normalizer that computes a main factor which measures an offset difference between the main parameter value of said new input pattern and said reference value, and that sets the input pattern at said reference value as a normalized pattern using said main factor;

applying said normalized pattern to a classifier having normalized patterns stored therein as prototypes to generate the category by comparing an input signal pattern with a stored prototype, wherein the normalized patterns

stored in the classifier are obtained from normalized patterns of previous input signals in said succession of input signals, wherein said prototypes represent the codebook memory of the classifier, and wherein said category and said main factor are the identification data of said new input pattern;

applying said category to said codebook memory to extract the normalized pattern corresponding thereto; and,

applying said normalized pattern and the main factor to a denormalizer to retrieve a pattern close to said new input pattern.

14. (Previously presented) The method of claim 13 wherein said at least one main parameter is of a mean value, and said main factor consists of an offset used to shift the input pattern to said reference value.

15. (Previously presented) The method of claim 13 wherein said at least one main parameter is the orientation of the input pattern, and said main factor consists of an angle value used to rotate the input pattern to said reference value.

16. (original) The method of claim 13 wherein said at least one main parameter is the amplitude of the input pattern and said main factor consists of a gain used to modify the input pattern to said reference value.

17. (original) The method of claim 13 wherein said classifier is an input space mapping algorithm based artificial neural network (ANN).

18. (original) The method of claim 17 wherein said ANN comprises at least one ZISC neuron.

19. (currently amended) A system for encoding an input pattern of each of a succession of input signals, said input pattern being characterized by an essential feature or shape and at least one main parameter, wherein said main parameter is an element susceptible of modifying the input pattern but not the shape, comprising:

    means for applying the input pattern to a normalizer;

    means for applying a category to an ANN;

    the normalizer having a reference value for that parameter stored therein that computes a main factor which measures an offset difference between the main parameter value of said input pattern and a reference value thereof and that sets the input pattern at said reference value as a normalized pattern using said main factor; and,

    an ANN adapted to receive said normalized pattern and to store the normalized pattern in a neuron of the ANN as a prototype for analysis of subsequent input signals of said succession of input signals with the category associated thereto, wherein, in said analysis, an input signal pattern is compared with the stored prototype;

    wherein said normalized pattern, said category and said main factor represent the encoded pattern.

20. (currently amended) An identification system for encoding a new unknown input pattern of each of a succession of input signals, said input pattern being characterized by an essential feature or shape and at least one main parameter, wherein said main parameter is an element susceptible of modifying the input pattern but not the shape, comprising:

means for applying the new input pattern to a normalizer;

the normalizer having a reference value for the parameter stored therein and computing a main factor which measures an offset difference between the main parameter value of said new input pattern and a reference value thereof, and setting the new input pattern at said reference value as a normalized pattern using said main factor; and,

a classifier storing the normalized patterns of individual ones of input signals of said succession of input signals that have been previously learned in the codebook thereof as prototypes, the prototypes serving for analysis of subsequent input signals of said succession of input signals with the category associated thereto adapted to receive said normalized pattern from the normalizer to generate the category of the normalized pattern, wherein, in said analysis, an input signal pattern is compared with a stored prototype.

21. (currently amended) A retrieval system adapted to decode a new unknown input vector during a classification phase, the new input vector describing an input pattern of each of a succession of input signals, said input pattern being characterized by an essential feature or shape and at least one main parameter,

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wherein said main parameter is an element susceptible of modifying the input pattern but not the shape, comprising:

means for applying the new input pattern to a normalizer;

the normalizer having a reference value for the parameter stored therein and computing a main factor which measures an offset difference between the main parameter value of said new input pattern and a reference value thereof, and setting the new input pattern at said reference value as a normalized pattern using said main factor;

a classifier storing the normalized patterns of individual ones of input signals of said succession of input signals that have been previously learned in the codebook thereof as prototypes with the category associated thereto adapted to receive said normalized pattern from the normalizer to generate the category of the normalized pattern, wherein, in said classification phase, an input signal pattern is compared with a stored prototype;

means for applying the category of the normalized pattern to the codebook memory of the classifier;

means for applying the main factor to a denormalizer;

means for extracting the normalized pattern corresponding to that category from the codebook memory; and,

a denormalizer adapted to receive said main factor and said normalized pattern to retrieve a pattern close to the original input pattern.

22. (currently amended) A computer program product comprising:

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a computer useable medium having computer readable code means embodied therein for causing a computer to encode an input pattern of each of a succession of input signals using a normalizer and a classifier during a learning phase, the input pattern having an essential feature or shape and at least one main parameter that is an element susceptible of modifying the input pattern but not the shape, the computer readable code means in the computer program product comprising:

computer readable program code means for causing a computer to establish a reference value for the main parameter;

computer readable program code means for causing a computer to apply the input pattern for each of said succession of input signals to a normalizer that computes a main factor that measures an offset difference between the main parameter value of the input pattern and the reference value, and that sets the input pattern at the reference value as a normalized pattern using the main factor;

computer readable program code means for causing a computer to apply the normalized pattern and the category associated thereto by the user to a classifier; and

computer readable program code means for causing a computer to store the normalized pattern in the classifier as a prototype to be compared with an input signal pattern, wherein the normalized pattern, the category and the main factor represent the encoded pattern.

23. (currently amended) An article of manufacture comprising:

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a computer useable medium having computer readable program code means embodied therein for causing a computer to encode a new unknown input pattern of each of a succession of input signals using a normalizer and a classifier during a classification phase, the new input pattern having an essential feature or shape and at least one main parameter, wherein the main parameter is an element susceptible of modifying the new input pattern but not the shape, the computer readable code means in the article of manufacture comprising:

computer readable program code means for causing a computer to establish a reference value for the main parameter;

computer readable program code means for causing a computer to apply the new input pattern to a normalizer that computes a main factor that measures an offset difference between the main parameter value of the new input pattern and the reference value, and that sets the input pattern at the reference value as a normalized pattern using the main factor; and

computer readable program code means for causing a computer to apply the normalized pattern to a classifier having normalized patterns stored therein as prototypes to generate the category by comparison of an input signal pattern with a stored prototype, wherein the normalized patterns stored in the classifier are obtained from normalized patterns of previous input signals in said succession of input signals.